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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,371	04/12/2004	Steven C. Shannon	8824/ETCH/DRIE	4850

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EXAMINER

ARANCIBIA, MAUREEN GRAMAGLIA

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 09/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/823,371	Applicant(s) SHANNON ET AL.	
	Examiner Maureen G. Arancibia	Art Unit 1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>10/04/06/05/09/05</u> . | 6) <input type="checkbox"/> Other: _____  |

EL

## **DETAILED ACTION**

### ***Information Disclosure Statement***

1. The listing of references in the specification is not a proper information disclosure statement. 37 CFR 1.98(b) requires a list of all patents, publications, or other information submitted for consideration by the Office, and MPEP § 609.04(a) states, "the list may not be incorporated into the specification but must be submitted in a separate paper." Therefore, unless the references have been cited by the examiner on form PTO-892, they have not been considered.

### ***Drawings***

2. The drawings are objected to because the word "DUAL" is misspelled in Figure 1. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the

applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. **Claims 1, 6-8, 10, and 14-16 are rejected under 35 U.S.C. 102(e) as being anticipated by U.S. Patent 6,642,149 to Suemasa et al.**

In regards to Claims 1 and 10, Suemasa et al. teaches an apparatus for matching the impedance of a pair of RF sources coupled to a single electrode to the impedance of a plasma in a semiconductor substrate processing chamber, comprising: a processing chamber 102 comprising a first electrode 106; a first RF source 122; a second RF source 128; and a dual frequency matching circuit, comprising a first sub-circuit 120 for matching the impedance of a first RF signal generated by first RF source 122 to the impedance of the plasma, and a second sub-circuit 126 for matching the impedance of a second RF signal generated by second RF source 128 to the impedance of the plasma. The second sub-circuit is connected to the first sub-circuit to form a common output that is coupled to the first electrode 106. (Figure 1)

In regards to Claims 6 and 14, the first and second sub-circuits are capable of being fixed in a predetermined configuration prior to performing a process in the chamber. This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 7 and 15, the apparatus taught by Suemasa et al. is capable of matching the impedance of the first and second RF sources to the impedance of the processing chamber during processing by varying at least one of the variable components of the first and second sub-circuits (Figure 1), or by varying the frequency of at least one of the first and second RF sources, which are variable RF sources (Column 5, Lines 60-66; Column 6, Lines 6-16). This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 8 and 16, Suemasa et al. teaches isolation sub-circuits 118, 124 for preventing power supplied from either of the first and second RF sources 122, 128 from being coupled to the other of the first and second RF sources. (Column 4, Lines 1-3 and 11-13)

***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. **Claims 2-4, 9, and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suemasa et al. in view of Japanese Patent Application Publication 06-243992 to Deguchi et al. The following rejection refers to the Figures and English Abstract of this document.**

The teachings of Suemasa et al. were discussed above.

In regards to Claims 2, 9, and 11, Suemasa et al. teaches that each of the first and second sub-circuits 120, 126 comprise a variable shunt component (capacitor). (Figure 1) Suemasa et al. further teaches that each of the first and second sub-circuits comprise a set of series components, one fixed (inductor) and one variable (capacitor). (Figure 1)

Suemasa et al. does not expressly teach that each of the first and second sub-circuits comprise a fixed set of series components.

Deguchi et al. teaches that a matching circuit 14 should comprise a fixed set of series components (Figure 1)

It would have been obvious to one of ordinary skill in the art to modify the first and second matching sub-circuits taught by Suemasa et al. to have a fixed set of series components, rather than one fixed and one variable. The motivation for making such a

modification to each sub-circuit, as taught by Deguchi et al. (Abstract, Purpose and Constitution), would have been to shorten matching time and to improve responsiveness by substituting variance in the RF source frequency for variance in the series component (capacitor).

In regards to Claims 3 and 12, the match tune space of the first and second RF sources taught by Suemasa et al. would inherently be controllable by the variable shunt components (capacitors). This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

In regards to Claims 4 and 13, the match tune space of the first and second RF sources taught by Suemasa et al. would inherently be controllable by varying the frequency of the signal generated by one of the first and second RF sources, which are variable RF sources (Column 5, Lines 60-66; Column 6, Lines 6-16). This rejection is based on the fact the apparatus structure taught above has the inherent capability of being used in the manner intended by the Applicant. When a rejection is based on inherency, a rejection under 35 U.S.C. 102 or U.S.C. 103 is appropriate. (See *In re Fitzgerald* 205 USPQ 594 or MPEP 2112).

**7. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Suemasa et al. in view of U.S. Patent 6,887,339 to Goodman et al.**

The teachings of Suemasa et al. were discussed above.

Suemasa et al. does not expressly disclose the output impedance of the first and second RF sources.

Goodman et al. teaches that RF sources conventionally have a 50 Ohm output impedance. (Column 1, Lines 57-59)

It would have been obvious to one of ordinary skill in the art to use RF sources with a 50 Ohm output impedance in the apparatus taught by Suemasa et al. The motivation for doing so would have been to assemble the apparatus using standard (readily available) components.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maureen G. Arancibia whose telephone number is (571) 272-1219. The examiner can normally be reached on core hours of 10-5, Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on (571) 272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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